VINYL CHLORIDE
CAS # 75-01-4

This fact sheet answers the most frequently asked health questions (FAQs) about vinyl chloride. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to vinyl chloride occurs mainly in the workplace. Breathing high levels of vinyl chloride for short periods of time can cause dizziness, sleepiness, unconsciousness, and at extremely high levels can cause death. Breathing vinyl chloride for long periods of time can result in permanent liver damage, immune reactions, nerve damage, and liver cancer. This substance has been found in at least 496 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is vinyl chloride?

(Pronounced vī′nəl klôr′īd′)

Vinyl chloride is a colorless, flammable gas at normal temperatures with a mild, sweet odor. It is a manufactured substance that is used to make polyvinyl chloride (PVC). PVC is used to make a variety of plastic products, including pipes, wire and cable coatings, and the furniture and automobile upholstery.

Vinyl chloride also results from the breakdown of other substances, such as trichloroethane, trichloroethylene, and tetrachloroethylene. Vinyl chloride is also known as chloroethene, chloroethylene, and ethylene monochloride.

What happens to vinyl chloride when it enters the environment?

- Liquid vinyl chloride evaporates easily into the air. Vinyl chloride, if it is near the surface of soil or water, can also evaporate.
- Vinyl chloride in the air can break down within a few days to other substances, some of which can be harmful.
- Small amounts of vinyl chloride can dissolve in water.
- Vinyl chloride formed from the breakdown of other chemicals can enter groundwater.
- Vinyl chloride is unlikely to build up in plants or animals.

How might I be exposed to vinyl chloride?

- Breathing vinyl chloride that has been released from plastics industries, hazardous waste sites, and landfills.
- Breathing vinyl chloride in air or during contact with your skin or eyes in the workplace.
- Drinking water from contaminated wells.

How can vinyl chloride affect my health?

Breathing high levels of vinyl chloride can cause you to feel dizzy or sleepy. Breathing very high levels can cause you to pass out, and breathing extremely high levels can cause death.

Most of the studies on long-term exposure (365 days or longer) to vinyl chloride are about workers that make or use vinyl chloride. They were exposed to much higher levels of vinyl chloride in the air than is the general population. People who breathe vinyl chloride for long periods of time can have changes to the structure of their livers.

People who work with vinyl chloride have developed nerve damage and immune reactions. Other workers have

developed problems with the blood flow in their hands; the tips of their fingers turn white and hurt when they are in cold temperatures. Sometimes, the bones in the tips of their fingers have broken down.

Animal studies have shown that long-term (365 days or longer) exposure to vinyl chloride can damage the sperm and testes. It has not been proven that vinyl chloride causes birth defects in humans, but animal studies have shown that breathing vinyl chloride can harm unborn offspring and may also cause increases in early miscarriages.

The effects of drinking high levels of vinyl chloride are unknown. If you spill vinyl chloride on your skin, it will cause numbness, redness, and blisters.

How likely is vinyl chloride to cause cancer?

The Department of Health and Human Services (DHHS) has determined that vinyl chloride is a known human carcinogen. Vinyl chloride exposure results in liver cancer in people.

Is there a medical test to show whether I've been exposed to vinyl chloride?

The results of several tests can sometimes show if you've been exposed to vinyl chloride. If breath samples are taken just after exposure, vinyl chloride can be measured, but this is not helpful for measuring very low levels of the chemical.

Better information is gotten by measuring a breakdown product of vinyl chloride, thiodiglycolic acid, in the urine shortly after exposure. However, this test will not give information on the level of exposure. Exposure to other chemicals can produce the same breakdown product in the urine.

The binding of vinyl chloride to genetic material in your blood or tissue can tell whether you have been exposed to vinyl chloride, but this is not sensitive enough to determine the effects resulting from exposure. These tests are not available at most doctors' offices, but can be done at special laboratories that have the right equipment.

Has the federal government made recommendations to protect human health?

The EPA requires that the amount of vinyl chloride in drinking water not exceed 0.002 milligrams of vinyl chloride per liter of water (0.002 mg/L). The EPA requires that spills or accidental releases into the environment of 1 pound or more of vinyl chloride be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set the maximum allowable level of vinyl chloride in workroom air during an 8-hour workday in a 40-hour workweek at 1 part vinyl chloride per million parts of air (1 ppm).

Glossary

Carcinogen: A substance with the ability to cause cancer.

Immune reaction: Sensitizing response of the body to a chemical.

Milligram (mg): One thousandth of a gram.

Miscarriage: Pregnancy loss.

ppm: Parts per million.

Source of Information

This ToxFAQs information is taken from the 1997 Toxicological Profile for Vinyl Chloride (update) produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Animal testing is sometimes necessary to find out how toxic substances might harm people and how to treat people who have been exposed. Laws today protect the welfare of research animals and scientists must follow strict guidelines.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-639-6359. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.